

April 1, 1873.

Robert Hudson, Esq., F.R.S., V.P., in the Chair.

The following papers were read :—

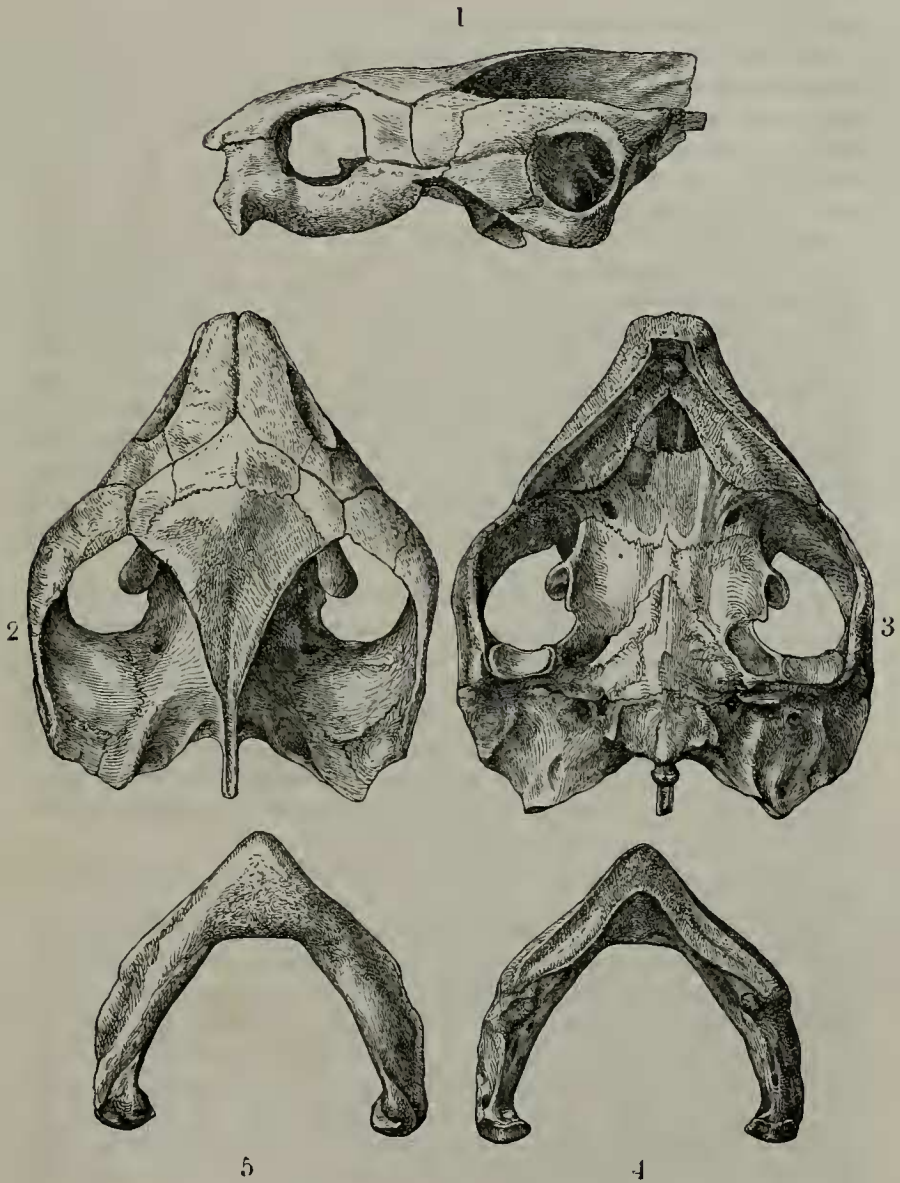
1. On the Skull of *Sternothærus*. By Dr. J. E. GRAY,
F.R.S. &c.

[Received February 21, 1873.]

In my essay "On the Genera of *Chelydidæ*, and the characters furnished by the study of their Skulls" (P. Z. S. 1864, p. 128) I was unable to describe the skull of the genus *Sternothærus*, as I did not possess or know of the existence of any skull of the genus; but I ventured to place it in the same section as the genus *Pelomedusa*, because its head was covered by hard, horny, symmetrical plates, and because I thought I felt the zygomatic arch well developed through the skin—a peculiarity that separates the African *Chelydidæ* from the S.-American and Australian genera of this group of Tortoises, and which induces me now to consider them a separate family, characterized by the structure of the skull, which in the African genera is most completely developed, while in the Australian and S.-American animals it is more or less rudimentary.

I did not figure the skull of *Pelomedusa*, because it had already been well figured in the Atlas of Wagler's 'Natürl. Syst. Amphib.' t. ii. figs. 36-44. This figure shows how very different the skull is from that of other *Hydraspidæ*, but does not show the base of the skull, palate, and alveolar surface, which is so important as indicating the food of the animal, and presents modifications that afford good zoological characters. Since that period we have fortunately discovered a very large skull, evidently belonging to the genus *Sternothærus*, which M. du Chaillu had used (as he did the new species of Bush-buck which I described in the P. Z. S. 1871, p. 594) to stuff out the skin of a large African mammal.

This skull is very much larger, nearly three times as large as any specimen of *Sternothærus* which we have in the collection, and it shows that I was right in referring this genus to the same group as *Pelomedusa*. It has all the characters of that group more fully developed: that is to say, the skull is very much depressed; the zygomatic arch is very strongly developed, being very broad and prominent; the middle of the upper jaw is prominent, notched on each side; and the lower jaw is very strong, with an acute produced central edge fitting into a deep pit in the front of the alveolar surface of the upper jaw, just within the prominent central margin. The beaks covering the jaws are horny, and conform to the shape of the bones, the middle of the upper part of the upper beak having a broad notch for the nostrils, the beak on the side of the nose going up to the upper surface of the nasal hole.

Skull of *Sternotherus*.

STERNOTHERUS. (Figs. 1, 2, 3, 4, & 5, p. 393.)

Skull very depressed, triangular, very broad, expanded, and swollen behind, as wide just before the tympanic cavity as from the front edge of the upper lip to the condyle.

Crown flat, with the marks of the sutures between head-shields well impressed, tapering on each side from the back edge of the zygoma to a narrow central prominence. Zygoma very strong, broad, and much bent out and convex, leaving a very large space on each side for the temporal muscle, and entirely enclosing the circular deep tympanic cavity. Beneath flat, wide, with a very large reflexed edge to each pterygoid bone, and a large hole in front of it, on the outer side of each palatine, on a level with the front of the zygomatic arch. The internal nostrils united, very large, triangular, with a long depression behind them, as broad as their hinder edge, with a slight central longitudinal prominence. The alveolar surface broad, becoming broader behind, with a deep circular central pit in front, for the reception of the point of the lower jaw, and a slight lateral ridge, which commences at the back edge of the central part and extends to the middle of the hinder part of the alveolar surface. The outer edge of the upper jaw sharp, bent in, and forming a deep notch on each side of the central part, which is square and prominent. The orbits are oblong, longitudinal, the nose being about half the length of the longitudinal diameter of the orbit. The nose-hole large and square.

The lower jaw depressed, strong, acute, and bent up in front, rounded beneath in front, and truncated behind at the gonyx, this part being covered by the horny beak as far as the hinder truncated edge. The sides strong, oblique, flattened. The alveolar surface flattened, slightly concave, with a sharp raised outer and inner edge, and with a triangular surface behind the centre, extending as far back as the truncated gonyx, separated, as is also the under part of the jaw, from the alveolar edge by a longitudinal groove for a blood-vessel or nerve, entering just before the condyle.

The skull is $2\frac{1}{2}$ inches from nose to condyle, $2\frac{1}{6}$ from cheek to cheek.

This skull differs from that of *Pelomedusa*, figured by Dr. Wagler in his 'Nat. Syst. Amphib.' t. ii. figs. 36-44, in being much broader and more depressed, and in having more developed zygomatic arches, and in being more swollen out at the sides, especially behind, also in the nose-hole being more erect and slightly hooded over by the nasals. The lower jaw is very similar; but the front part of the centre of the alveolar surface is much more produced and bent upwards, and the part of the centre behind the alveolar surface is more produced, concave, and truncated, while in *Pelomedusa* it is much narrower and regularly rounded.

It is to be observed that Dr. Wagler does not figure the alveolar surface of this species. The tympanic cavity is oblong in *Pelomedusa*, and the edge much more sinuated between the tympanic cavity and the end of the upper jaw.

2. Notes on the Genera of Turtles (*Oiacopodes*), and especially on their Skeletons and Skulls. By Dr. J. E. GRAY, F.R.S. &c.

[Received February 19, 1873.]

The number of species of Turtles is very limited, which is the case with the other sea animals that inhabit the warm or subtropical regions of the ocean. The Turtles, like the Sperm-Whale, have an extended geographical distribution, because many specimens wander or are carried away by currents from their natural habitats, and are often found as stragglers far away from the place which they properly inhabit. Thus the Luth (*Sphargis*) has been observed in the Mediterranean, and on the coast of Dorsetshire and Yorkshire, at New Zealand, Australia, and on the coast of Japan; but I have no authority for believing that it breeds in any of these places. The Loggerhead (*Caouana*), the imbricate Turtle (*Caretta*), and the Turtle (*Chelonia*) have also been found, under similar circumstances, at a considerable distance to the north or south of the tropics.

The species have been very imperfectly studied; and several are named in different works that are very insufficiently characterized, and for this reason difficult to recognize as distinct. Four kinds are recognized by sailors and the world in general; and each of these kinds has such a distinct organization as to be considered by zoologists the type of a particular group; but the characters of the groups have been very imperfectly described. They each have a very peculiar conformation of the head and skull; these peculiarities have not yet been used by zoologists in the manner which they deserve.

The Turtles or *Oiacopodes*, though they have a general external resemblance, may be divided into two very distinct series.

Several species are described, and said to be figured by Mr. Girard in the 'Herp. Expl. Exped.' of Wilkes; but our copy of that work does not contain the plates, and the descriptions are very difficult to understand*.

* In reply to an inquiry about the imperfections in our copy of this work to Prof. S. F. Baird, he states, "I have made an examination of our copy of the plates of the Herpetology of the Exploring Expedition, and find it contains the full number of thirty-two plates, corresponding to the explanations of the plates. The Government edition of this work, and that which you have in the British Museum, embraced only twenty-three plates, the additional ones having been prepared at Mr. Girard's expense for the extra copies.

"Should you desire this work, you can obtain it without any difficulty from Messrs. J. B. Lippincott & Co. of Philadelphia, who published the book and still have it on sale."—April 5th, 1873.

P.S. (July 15th).—The Society having lately received the Atlas of the 'Herpetology of the U. S. E. E.' with 32 plates, I send the following notes on the plates:—

1. Pl. 29. *Thalassochelys corticata* is *Caouana caretta*.
 2. Pl. 30. f. 1-7. *Caretta squamosa*. Sooloo Seas.
 3. Pl. 30. f. 8-13. *Caretta rostrata*. Fiji Islands.
- These two species are unknown to me; but they are said to have imbricate shields, and therefore cannot be *Onychochelys kraussii*.
4. Pl. 31. f. 5-7. *Chelonia marmorata* (not *Euchelys macropus*, as marked in the plate).

- I. THE TURTLES: *with the bones of the vertebræ and ribs expanded and forming in the adult state a complete bony disk, the bones of the sternum separate, but united by dentated sutures into a disk, and edged with a series of marginal bones.*

Both the back, margin, and sternum are covered with more or less thick, regular, symmetrical, horny plates, as in most other *Chelonians*.

The head is covered with symmetrical shields; and the nostrils are in the front, just over the upper edge of the upper beak, which has a more or less deep notch for their reception.

This group contains two very distinct families.

Fam. 1. CHELONIADÆ, Gray, Hand-list Tort. p. 92.

The head covered with few, regular, symmetrical shields, and with only one superorbital shield on each side, and two shields on each side of the occiput. The beaks horny, the upper one occupying more than half of the lateral margin, with a sharp dilated margin. The lower jaw fitting into the upper, the lower beak being short, and truncated behind, on a level with the central suture or gonyx, and covered with a large elongate horny plate on each side.

The head has in the central line two nasals, a frontal, a parietal, and two occipital plates. Two temporal plates. The cheeks are covered with several plates, three or four forming the back edge of the orbit, the front upper part of which is covered by the outer edge of the nasals.

The tympanic cavity in the skull is surrounded by a large smooth concavity, defined by the surface of the temporal bone.

The hinder central bone of the dorsal disk, even in the young specimens, reaches to the front edge of the hinder central marginal or caudal bone.

Tribe 1. CARETTINA, Gray, *l. c.* p. 92.

The head produced, compressed, and narrow in front. The lower jaw smooth, even on the edge, and covered with the beak on the outside, and only slightly fitting into the upper beak, which is smooth on its inner surface. The alveolar surface of the upper beak and of the skull beneath it with a broad diverging ridge on the middle of each side, which is separated in the front by a longitudinal groove; that of the lower beak and jaw deeply concave, with

5. Pl. 31. f. 8. *Chelonia tenuis*.

The figures of these two species do not afford me the means of determining what species they belong to; but they are certainly not what I have described as new.

6. Pl. 31. f. 9-11. *Euchelys macropus*, Philippine Islands, is a young *Chelonia*, very likely the young of *C. mydas* or *C. marmorata*. It is not named on the plate.

7. Pl. 32. *Actinemys marmorata*, young and adult. Puget's Sound, Oregon, and Sacramento.

This species is very different from the *Emys nigra* of Hallowell, quoted as a synonym in the text, and is evidently a redescription of my *Emys olivacea*.

a ridge near its hinder margin, having a longitudinal keel across the hinder half of the concave surface.

The palate behind the nostrils in the skull is rather concave, and diverges behind into a groove, produced by the elevated margin of the basioccipital and basisphenoid bone.

1. CARETTA.

1. CARETTA IMBRICATA, Gray, Cat. Tort. p. 74.

The outer side of the head showing the shields and the upper part of the skull is figured by Temminck in the 'Fauna Japonica,' t. v. & vi. The band of shields at the back edge of the orbit contains three, one being below between the other two and the back margin of the jaw. Temminck's figure of the head of *C. imbricata* in the 'Fauna Japonica,' t. v. f. 1, does not give a correct idea of the shields of the head as they usually are; the frontal and parietal plates are united into one, and the soft naked space between the nostrils and the frontal plate is figured to represent a pair of plates.

In a skeleton of this genus in the British Museum, with the dorsal shield 7 in. long, the hinder central bone of the dorsal disk is expanded, ovate-lanceolate, rather contracted before, then slightly dilated, and gradually narrowed behind for more than half its length, when it reaches the front edge of the hinder marginal bones. It is keeled on the back as on the vertebral plates. The front of the two hinder central bones is band-like, nearly as broad as the dilatation of the last rib, and narrower in front.

In a second skeleton in the British Museum, with the dorsal shell $10\frac{3}{4}$ in. long, the last bone is rather broader and more ovate.

2. ONYCHOCHELYS, Gray, Hand-list, p. 93.

The beak and shields of the head like those of *Caretta imbricata*, but the occipital shields larger and longer, the beak more compressed, and the end produced and bent down in the centre. Dorsal shields covered with simple, thin, flat, not thick, imbricate plates. Costal shields 4. 4. Front fin with a very large claw to the first, and a small claw to the second finger. The front lateral sternal bones with one acute lobe on the left side, and two acute lobes on the right side of the inner edge directed straight across; hinder lateral bones with three or four acute diverging lobes on the inner edge, the hinder lobes being rather directed backwards; the styliiform process of the front odd bone elongate or slender.

This genus is very like *Caretta*; but the upper beak is larger and bent down at the end in front, and not truncated as in *Caretta*; and the lower beak is also larger and stronger, and the lateral shields on the side of the lower jaw not quite so large. All the plates on the dorsal shield are thin, and not at all produced on the hinder edge. The front vertebral plate is very broad and triangular, much broader than long, and slightly truncated at the front lateral edges; the second, third, and fourth vertebral plates are hexagonal, contracted on the hinder lateral edges; the hinder vertebral plate is elongate

triangular, truncated in front, and slightly notched behind in the centre. The hinder pair of caudal plates are very long, much longer than broad, four-sided, the hinder and outer sides shortest; and the hindermost lateral plate has a straight inner edge, and is not angular and produced as in *Eremonia elongata*.

The dorsal shield of this genus has some resemblance to the shield of *Eremonia elongata* in the large size of the caudal marginal plates; but of the latter genus the head and limbs are unknown: it belongs probably to the family *Cuouanidæ*, as it has five costal shields on each side; while this has only four, and belongs to *Cheloniadæ*. The shields of the two genera may be thus distinguished:—

Onychochelys.

Costal plates 4 . 4.

First vertebral shield triangular, with lateral angles truncated, much longer than broad.

Second, third, and fourth vertebral shields hexagonal; lateral angles produced, as broad as long.

The penultimate marginal shield with a straight inner edge.

Eremonia.

Costal plates 5 . 5.

First vertebral shield hexagonal, as broad as long.

Second, third, and fourth vertebral shields very long, oblong, four-sided, with the middle of the sides rather prominent, much longer than broad.

The penultimate marginal shield prominent, angular in the middle, projecting between the last costal and the last vertebral shields.

1. *ONYCHOCHELYS KRAUSSI*, Gray, Hand-list, p. 93. (Fig. 1, skull; fig. 2, animal.)

Chelonia marmorata, Krauss, not Duméril and Bibron.

Hab. Ocean, French Guiana (*Krauss*).

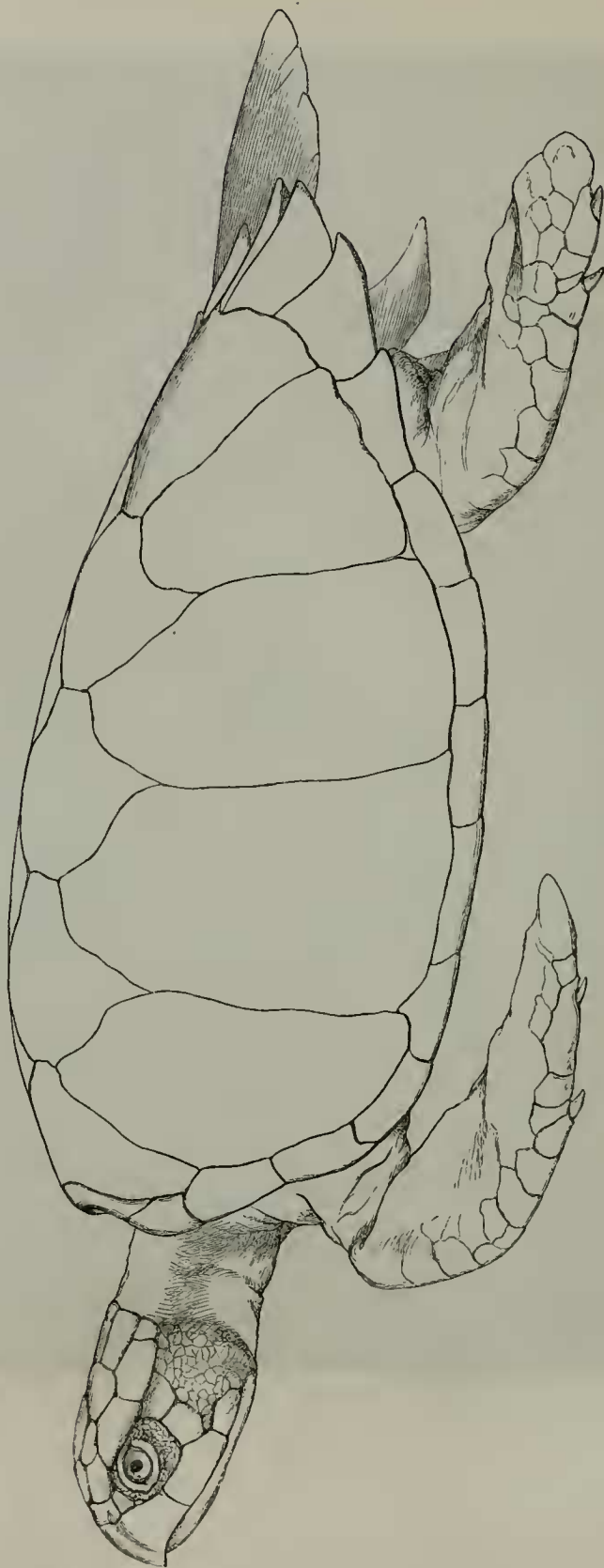
The palate deeply concave, with a deep well-marked groove on each side of the basioccipital bone, which has a very strong ridge on its front lateral margin. The alveolar surface of the upper beak with a very high arched ridge, which is much the highest in front, and very rugose on its edge and on the hinder part of its surface, having an obscure indication of a ridge parallel to its hinder margin, and then shelving down to the inner nostrils. The alveolar surface of the lower beak concave, very wide in front, narrow on the sides, becoming narrower behind, and with a sharp elevated ridge on the inner margin. There is a longitudinal central ridge across the hinder half of the concavity of the lower alveolar edge. The concavity of the alveolar of the lower jaw fits on to the ridge in the upper jaw. The inner surface of the beak within the hinder ridge is yellow and horny like the outer surface. It is broad and high in front, gradually narrowing on the sides; the surface is smooth, with a groove on each side in the middle of the front; and the sides have close parallel grooves ending in crenations on the margin of the ridge.

The specimen in the British Museum is full-grown, and has the dorsal shell 35 in. long, and 31 in. broad in the widest part over the

Fig. 1.

*Skull of Onychochelys kraussi.*

Fig. 2.

*Onychochelys kraussi.*

curve. The horny plates are thin, smooth, worn, and are studded with different-sized Turtle-barnacles (*Chelonobia*), and also with a large number of common barnacles, especially on the sides of the back, leaving the middle of the dorsal plates bare.

The specimen here described was sent to me by Dr. Krauss from Stuttgart, as *Chelonia marmorata* of Duméril and Bibron (Erp. Gén. ii. p. 346, t. xxiii. f. 1); but it cannot be that species, for they say, "Sous le rapport de la forme, cette espèce ne diffère pas de la précédente (*C. maculosa*), elle s'en distingue seulement par son système de coloration." He figures the head-shields (t. xxiii. fig. 1 a) as like those of *C. mydas*, and very different from the head-shields of *C. imbricata* on the same plate (fig. 2 b), which these are like.

I may here remark that their figure of the beak of *C. imbricata* is so incorrect as to represent this species rather than the true *C. imbricata*, which is the one that their figure of the back represents.

Dr. Krauss has kindly sent me the head of a rather larger specimen of this Turtle, which enables me to describe the alveolar surface of the jaws, which is very different from that of any known Turtle, and confirms the genus. This head has the shields rather different from the specimen originally described; and as the shields on the two sides of the head are not regular and similar, we may consider them abnormal. There is a narrow strap-shaped shield on the left side and parallel to the outer margin of the large central hinder plate; but this shield is separate on the hinder half, and united to the central shield on the front half of the right side of that shield. In the same manner the large temporal shield just beside the supraoccipital shield is divided into three shields on the left side, and into two shields on the right side of the head; and the upper shield is longer on the right side than it is on the left: but it is easy for any one to see that these do not alter the character.

Tribe 2. CHELONINA.

The head is oblong and rounded in front. The lower jaw is strongly dentated on the outer edge, and, except just in front, is strongly striated on the outer surface, and fits into the very high sharp margin of the upper beak, which is also deeply and regularly grooved on its inner margin. The alveolar surface of the upper beak and of the skull beneath it with a narrow diverging ridge on each side nearer the outer than the inner margin, separated by a longitudinal groove in the centre, and with a linear raised granular ridge margining the hinder edge of the alveolar surface. The alveolar surface of the lower beak and jaw with a strongly dentated edge, and a deep triangular concavity within it, divided in half by a central longitudinal ridge, and with a sharp ridge parallel to but some little distance from the hinder margin, the acute ridge and flat hinder space being granular. The horny part of the lower beak triangular, only covering the front end of the jaw. The horny plate on each side large, narrow, and only covering the front two thirds of the narrow prominent lower part of the jaw. The band of

shields at the back edge of the orbit consisting of four or five shields, one at the lower part of the orbit between the other shields and the margin of the jaw. They seem to vary in number, as in one specimen there are four on one side and five on the other; but I believe four is the usual number. The skull is not so broad compared with its length as that of the Loggerhead (*Caouana*).

1. CHELONIA.

Temminck represents the side and top of the head and the side and top of the skull of *Chelonia viridis* (Fauna Japonica, t. iv. & vi.).

The sternum is well figured by Cuvier (Oss. Foss. t. xiii. f. 6).

The generality of specimens in the British Museum have the hinder part of the base of the skull nearly flat; but there is one skull of a half-grown Turtle which has this part keeled in the middle, and there is a concavity on each side of the middle, and diverging on each side of the triangular prominent basisphenoid bone. This may be the character of one of the species; but I have not the specimen to which the skull belongs, and therefore cannot name it with certainty. There is another small specimen which seems to have this character not quite so much developed; but it is also the odd skull of a Turtle that was "dressed" in 1811, and weighed 66 lbs.

I think both these skulls are rather narrower compared with their length than the other skulls, which have this part more flattened.

In a dorsal shield of a skeleton of *Chelonia viridis* in the British Museum, 34 in. long, the hinder of the two odd bones placed beyond and attached to the hinder edge of the dilated part of the last pair of ribs is nearly semilunar, about half as long as broad, with a projecting rounded hinder edge, very short, and band-like on the lateral margin, which is nearly as broad as the back edge of the dilatation of the last or eighth pair of ribs. The front margin is concave. The last odd bone is triangular, as broad as long, with a broad semicircular front edge, and is contracted on the sides in front at the hinder part, and is attached by its tip to the front edge of the two hinder marginal bones. In the older specimens, when the dilatations of the ribs reach the marginal bones, these odd bones do so at the same time, and thus lose their characteristic form.

In one specimen with the dorsal shield $4\frac{3}{4}$ in. long, which has three straight rays on one side and four on the other, the front odd bone between the last ribs is rhombic, longer than broad, narrower in front; and the second bone is elongate-lanceolate, narrow in front and behind, not reaching the inside of the hinder marginal bone.

1. CHELONIA VIRIDIS.

2. CHELONIA VIRGATA.

There appears, by the colouring of the dorsal disk, to be two species of true herbivorous Turtle, *C. viridis* and *C. virgata*, Cuv.; and I formerly thought that I had discovered an organic character in the form of the last two central vertebral plates between the

hinder edges of the last pair of ribs : but the re-examination of a larger set of specimens of different ages makes me doubt the importance of the characters assigned to them ; for I cannot find, in a very large series of specimens, any character but such as is altered with age, and seems common to the whole group, either in the form of the skull or form and development of the bones of the disk. Though the middle-aged specimens are differently coloured, as if indicating two species, all the very young specimens are very much alike, as if they belonged to one species.

It is the same with the form and development of the shell and of the dorsal and sternal disks, which are all liable to slight and apparently unimportant variations ; and evidently, from the dorsal shells we have received, the animals of which have been cooked, the green and rayed Turtles are both eaten.

At the same time it should be recollected that museum zoologists labour under great disadvantages ; and if the two species or varieties could be examined alive and their skeletons compared, a character might still be found to distinguish them.

Fam. 2. CAOUANIDÆ.

The head broad, covered with regular symmetrical shields, with three or four pairs of shields over the orbit, and two shields on each side of the occiput. The beaks large and horny, the lower one just fitting into the edge of the upper, the upper and lower beaks occupying the greater part of the lateral margin of the jaws ; the hook of the lower beak fitting into a pit in the alveolar surface of the upper one ; the lower beak covering the greater part of the lower jaw, which has small scales on the hinder part of the sides.

Tribe 1. CAOUANINÆ.

The jaws strong. Costal shields five on each side, the front shield small and thin ; hinder ones broad, as broad as two marginal shields. The nuchal shield very broad, as broad as the first vertebral. The alveolar surface of the upper beak and skull beneath it smooth, with a deep pit in front for the acute point of the lower beak and lower jaw. The base of the skull of *Caouana* is nearly flat, with a narrow groove behind diverging at each side of the front edge of the rather prominent triangular basisphenoid bone. The tympanic cavity has a smooth naked space in front of it, which is flat, and not concave as in the *Cheloniadæ*. In *Caouana* the front pair of sternal bones is narrow, and the front odd bone is lanceolate, rather broad. The inner edge of the front and hinder pairs of lateral bones has many radiating acute processes. The radiating processes on the inner side of the front pair are directed forwards, and those of the hinder pair are directed backwards. The two central bones between the hinder edges of the last pair of ribs are thick and keeled externally, comparatively short in the young specimens, and do not reach the hinder margin of the caudal marginal bones. The costal and vertebral shields of the young are

strongly keeled; but the keels of the costal plates soon entirely disappear, and those of the vertebral plates remain for the greater part of the life of the animal. The vertebral plates are as broad as long, or broader in the young specimens; but they increase in length as compared with their breadth as the animal grows older.

1. CAOUANA.

The superocular plates are three on each side, the front one being the longest, and meeting the plate on the opposite side in front. The two hinder broader than long, with three shields on the back edge of the orbit, the lower one being the largest. The head-plates are very variable: there is generally a plate behind the suture of the occipitals; sometimes it is placed between the pair; sometimes these plates are moderate, at others very small. The frontal plate varies greatly in size. The parietal plate is generally large and simple; but in one specimen in the British Museum it is divided into two equal plates by a central longitudinal suture.

The skull of this genus is figured in Cuvier, *Oss. Foss.* v. t. ii. f. 1-4.

The shields of the head figured by Temminck in the 'Fauna Japonica' under the name of *C. cephalo*, t. iv. f. 1-3, probably belonging to this genus; but it has a very large central occipital, which is certainly not the normal form of the species which has come under my observation.

1. CAOUANA CARETTA.

The sternum of *Caouana* is figured by Cuvier (*Oss. Foss.* t. xiii. f. 7), but with too few hinder lateral lobes, and by Prof. Owen (*Phil. Trans.* 1849, p. 153, f. 3) with too many anterior and posterior lateral lobes.

A skeleton of *Caouana* in the British Museum, with the dorsal shield 17 in. long (the dilatation of the ribs being only extended for about two thirds the length of these bones), has the first of the two odd bones between the hinder pair of ribs consolidated with the rest of the disk; but Prof. Owen, in a specimen apparently about the same size, represents (f. 1, s 10) this bone as band-like, about half as broad again as long, and six-sided. The Museum specimen has an oblong elongate last bone, nearly twice as long as broad, rather broader in front than behind, and slightly constricted a little in front of the hinder margin. It is very thick, strongly keeled on the upperside, with a rounded tubercle at the end of the keel. It does not reach the hinder edge of the two hinder marginal bones.

This bone is well seen in the younger specimens of the complete animal, and forms a prominence at the end of the dorsal keel; but I believe it dilates on the sides, as the sides of the ribs dilate in the older specimens, so as to form with the ribs and margin a solid continuous shield. The bone is not well represented in Prof. Owen's diagram.

In a young specimen 9 in. long, the front odd hinder bone is

rhombic, rather broader than long, and the second one is ovate, linear, three times as long as broad. This bone does not nearly reach the front edge of the caudal marginal bone, nor does it do so in much larger specimens (as, for instance, the skeleton in the Museum), while it does in specimens of *Chelonia* in a less-developed state.

In a specimen in the Museum, 8 in. long, the front odd bone has become much broader and band-like, and the hinder bone broader, becoming gradually narrower in front, assuming an elongate triangular shape, and reaching the edge of the caudal plates; and it appears to grow wider as this angle increases in size, having rather concave sides in the younger specimens.

I formerly thought that the shape of this bone would distinguish the two presumed species; but the examination of a large number of specimens of all sizes and ages makes me have less faith in the character for even separating the younger specimens.

MM. Duméril and Bibron, in the 'Érptologie Générale,' vol. i. p. 25, t. ii., give a representation of the skeleton, which they call "Chélonée Caouane," which either does not represent this species or is very incorrect. Indeed I do not know from what species it could have been taken. Can it be from a specimen made up of bones of several species? The head is much slenderer than that of *C. caouana*; it is slender and acute in front, like that of *Chelonia imbricata*. The ribs are only dilated about two thirds of the length, showing that it is from a young specimen; yet the two hinder central bones between the last pair of ribs and the margin are broad, dilated and oblong, and united to the front edge of the hinder marginal bones, very unlike these bones in a young Loggerhead, where they are oblong, longitudinal, thick, and do not reach the marginal bones.

Professor Owen, in his 'Monograph of the Fossil Reptilia of the London Clay,' gives the figures of the bones in a front and back view of the dorsal shield of this species and the sternum (pp. 3, 4, f. 1-3). As is his custom, he gives the name of *entosternal* to the front median piece, *episternal* to the anterior pair of sternal bones, *hyosternal* to the second, *hyposternal* to the third, and to the posterior pair *xiphisternal* (p. 4); and Professor Huxley, in his 'Manual of Anatomy,' p. 202, f. 64, changes the names of these bones to *interclavicle*, *clavicles*, *hypoplastron*, and *xiphiplastron*.

Chelonia subcarinata of Owen's 'Fossil Reptilia of the London Clay,' t. viii., seems nearly allied to this genus; but I should doubt several of the fossils (as *C. breviceps* and *C. longiceps*) belonging to it; at least, if they are marine Turtles, they belong to a group quite distinct from any of the existing forms.

Tribe 2. LEPIDOCHELYINA.

The jaws very strong, the lower one very acute and strongly bent up in front. Costal shields seven on each side; the first smallest, the fourth, fifth, sixth, and seventh very narrow. The nuchal shield as wide as the first vertebral. The alveolar surface of the upper beak

and skull beneath it with a triangular ridge on each side, divided in front by a central longitudinal groove; of the lower jaw concave, with a sharp edge on the outer and inner margin. Claw of the first finger moderate.

1. LEPIDOCHELYS.

Head not so broad as long; sides flat, angularly contracted in front. Dorsal shield keeled, the nuchal plate very broad, the first vertebral broader than long, the second and third much longer than broad; front fin with one small claw on the outer side. The nasal shields broader than long, the frontal plate elongate, six-sided, the parietal plate subtriangular, broader behind, covered in front by the hinder part of the frontal plate, many-angular on the sides, and with an arched-out hinder margin. Occipital shield single, transverse, large, rounded in front, truncated behind. Superoocular shields three on each side; the front one square, united with the opposite one in front of the frontal; the middle one largest, rather longer than broad; and the third smallest, broader than long. The cheeks with a series of four shields, the upper being small and square. Upper beak with a slight central hook; the alveolar surface with a ridge on each side, interrupted in the middle, rather closer to the inner edge than the outer one. Inner edge with a blunt raised margin. The alveolar surface of the lower jaw deeply concave, with a high acute ridge on the front and hinder margins, and a well-marked central longitudinal ridge across the concavity in front, which is more acute and higher behind, and with a broad deeply concave space behind the inner ridge.

The upper alveolar surface of the beak of this species is very like that of *Cephalochelys*; but the lateral ridge on each side is nearer the hinder margin, and the surface behind it is not only margined on the edge, but is much narrower. In some respects the upper alveolar surface is more allied to that of *Chelonia*; but the lateral ridges are much further from the outer margin, and the alveolar surface of the lower beak is narrower, with a more decided central longitudinal ridge, and a much wider concave surface within the ridge; and the beak itself is not nearly so high and strong.

The sternum is callous on the three pairs of lateral bones, leaving a longitudinal soft space in the middle. The front pair of bones, which are short and V-shaped, and the broad lanceolate odd bone, which is broad and angular in front and produced and tapering behind, about once and a half as long as broad, are only covered with a soft skin, which is transparent.

The hinder vertebral bone in this adult specimen is broad, the whole width of the two posterior marginal plates.

There can be no doubt that it is quite a different genus from the common Loggerhead (*Caouana*), not only in the form of the last vertebral bone, but also in the shape of the shields of the head.

The number of the costal shields is increased by what are usually considered the fourth and fifth being divided in half, so that there is a distinct shield over each of the hinder ribs, instead of one to

each pair of ribs. I thought at first that this might be an individual peculiarity; but it appears common to the group; for it is equally well marked in a nearly adult shell, in a younger one about two thirds the length of the former, and in a very young one five inches long.

The dorsal shield of this genus is very thin, more like a thin, hard, semitransparent skin than the horny plates usually called tortoise- or turtle-shell; and it allows the sutures of the bone to be seen through it.

Fitzinger, in his 'Systema Reptilium,' p. 30, gives two generic names to this species, *Lepidochelys olivacea* and *Thalassochelys olivacea*. As I wanted a generic name, I have employed the first name, and given it a proper character; but I have no doubt that it will be quoted as Fitzinger's genus, although his character is not taken from nature.

This genus differs from the genera *Caouana*, *Caretta*, and *Chelonia* in the number of head-shields that it possesses.

1. *LEPIDOCHELYS OLIVACEA*, Gray, Hand-list Tort. p. 91.

There is a nearly adult animal and shell of this species in the British Museum. There is also a dorsal shell of a specimen nearly adult, but only 18 inches long, from Cape York, which has elongated vertebral plates like the former specimen. This specimen is peculiar for having six vertebral shields; but the three hinder are very short, the first and sixth being much shorter than broad, and the fifth about as broad as long. They appear to be merely a malformation of the fourth and fifth shields in the more adult specimens.

The keel is compressed and very high on the hinder half of the first and second, and only slightly marked on the hinder part of the third, and on the hinder and front part of the fourth and fifth vertebral shields, the position of the two lateral plates being caused by the unusual division of these plates. The hinder or caudal shields are very large, long and square, approaching to what they are in the genus *Eremonia*.

There is also in the British Museum a young specimen of the genus from the Philippine Islands which appears to belong to the species; the back is three-keeled, the keel of the vertebral plates, which are broader than long, being the highest; it has seven costal shields on each side. The sternum is bluntly keeled on each side. The lower beak is rather shorter than in the adult specimen in the British Museum, and it has a narrower elongate plate on each side behind it; but this plate is very unlike the large elongate oblong shield on the side of the jaw of *Chelonia*.

The beak of the lower jaw appears to be smaller than in the adult animal; and in this respect it is something like the genus *Caouana*, which has the lower beak smaller compared with that of the adult *Lepidochelys*.

In this specimen there is a small square shield interjected between the fourth and fifth vertebral shields.

2. CEPHALOCHELYS.

Head large. Beak very large and strong, with a deep notch on the centre of the margin of the upper edge for the nostrils. Nasal shields very short, broader than long; the frontal plate elongate, narrow in front; parietal shields moderate, broader than long, many-sided; occipital shields two, large, with some small scales at the hinder part of the central suture. Four superocular shields on each side; the two front square, rather longer than broad; the two hinder larger, broader than long. The cheeks with a series of four shields on the hinder edge of the orbit, the upper one being the smallest and shortest. The temples with three large shields and some small ones.

The alveolar surface of the upper beak with a large diverging ridge on the middle of each side, which is much broader in front (and these are separated from each other by a longitudinal groove), with a pit quite in front of it, for the reception of the hook of the lower jaw, and with a very broad, nearly flat surface behind it. The alveolar surface of the lower beak very deeply concave, with a very sharp high outer edge, and a high acute edge on the inner side, with a central longitudinal prominence crossing the hinder half of the alveolar concavity.

The pectoral fins with a large strong claw at the end of the front finger.

1. CEPHALOCHELYS OCEANICA, Gray, Hand-list Tort. p. 91.

Unfortunately the British Museum only possesses the head, neck, and fore fins of this Turtle, which was purchased of a dealer, who said it came from the West Coast of America—he believed, Mexico; so that I cannot describe the rest of the animal, and especially the bones of the back and sternum and the plates with which they are covered. The size of the beak and the shields of the head leave no doubt that it is distinct.

3. ? EREMONIA.

Head and fins unknown.

Shell elongate, contracted behind, marginal plates seventeen. Two caudal marginal plates very large, square, much longer than broad. Thorax convex on the sides. Vertebral shields in the adult much longer than broad, slightly six-sided, scarcely keeled; the last very large, as broad as long.

1. EREMONIA ELONGATA, Gray, Hand-list Tort. p. 96. (Fig. 3, dorsal disk.)

Caouana elongata, Gray, Cat. Tort. &c. B. M. 1840, p. 53; Cat. Sh. Rep. p. 73.

Hab. Ocean.

The shell of this animal has been in the Museum for more than forty years; and, though frequently searched for amongst dealers and in museums both British and Continental, I have never been able to

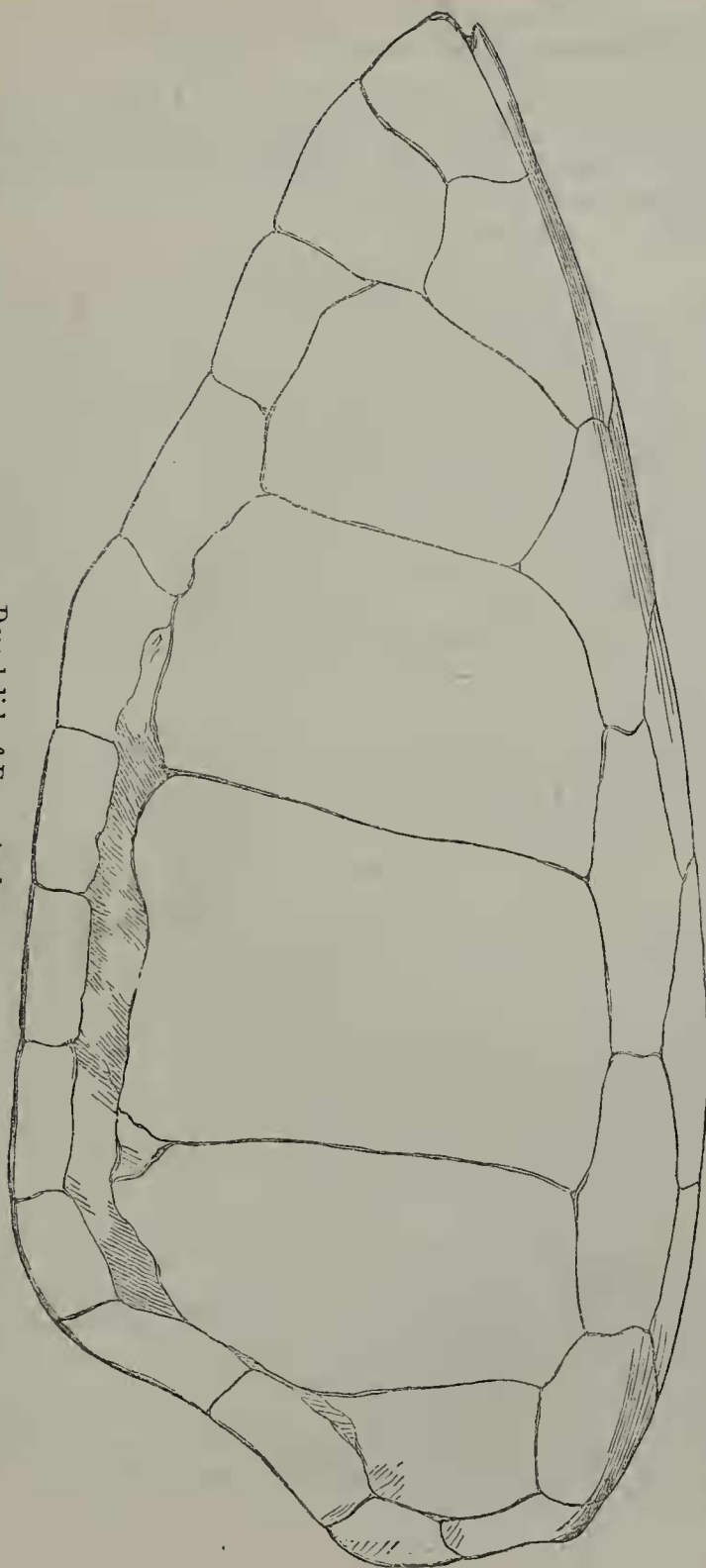
Dorsal disk of *Eremonia elongata*.

Fig. 3.

find a second specimen, much less one with the animal; and therefore I have ventured to form a genus for its reception.

- II. THE LUTHS (Sphargididæ) *which have the vertebræ and ribs separate both in the young and adult state, as in the generality of vertebrated animals. The bones of the sternum very slightly developed, and only forming an imperfect marginal ring, being destitute of any marginal bones.*

FAMILY I. SPHARGIDIDÆ.

The outer case of the animal, which has the external appearance of the bony case of a Turtle, is formed of very thick skin studded with close polygonal tubercles, and strengthened with longitudinal ribs supported by larger oval tubercles, which form prominences on the ridges of the back, and especially on the tail of the animal.

The head, unlike those of other Turtles, is covered with a soft skin, and is much rounded in front; the nostrils are small, and high up, on a level with the eye; the upper jaw notched on each side; and the lower jaw, which is weak, is furnished with a conical prominence in front, fitting into a hole in the palate of the upper jaw. The nasal hole in the skull is high up from the lower lip, and separated from it a considerable distance by the high large intermaxillary bone, which is large, but not so large, in *Caouana* or *Lepidochelys*.

The sternum of the very young animal is figured in the 'Annals and Magazine of Natural History,' 1873, t. vi. f. 5. The fore fins are very long, and the finger-bones of the fore and hind fins are rather more regular in length than in other Turtles.

1. SPHARGIS.

The adult skull (t. ii. f. 1 & 2) and other parts of the osteology of this species are figured by Temminck in the 'Fauna Japonica,' t. ii. & iii. The animal from life, and a front view of its head, are figured in t. i. & v. of the same book. I have figured the skull of the young in the 'Suppl. Cat. Sh. Rep.' p. 119, f. 40; and Wagler in the 'N. Syst. Amphib.' t. i. f. 5, 6, & 10-13.

Dr. Wagler, in his 'Nat. Syst. Amphib.' t. i. f. 1-23, figures the osteology of a newly hatched specimen, showing that the ribs are slender and free for their whole length, and the sternum formed of very slender rudimentary bones, which are divided into a front and a posterior group.

In my paper on the development of the sternum of Tortoises, in the 'Annals and Magazine of Natural History' for March 1873, I described and figured the sternum of a newly hatched specimen; and I described the vertebral ribs and sternum, as seen on the inside of the skin, of an adult specimen from the Cape, showing that the ribs and sternal bones of the adult are not dilated as in other Chelonians.

The skeleton of the adult in the Museum of Stuttgart, Dr. Krauss informs me, was extracted from a specimen sent in spirits from Suri-

nam, the skin of which is also exhibited, stuffed, in the Museum. Dr. Krauss intends shortly to describe and figure the skeleton*.

1. SPHARGIS CORIACEA, Gray, Cat. Tort. p. 71.

A specimen of this species has this month (February 1873) been taken on the coast of Yorkshire; but I fear it has been so cut up that it will not make a skeleton.

3. On a Scaup Duck found in China. By ROBERT SWINHOE, F.Z.S., H.B.M. Consul, Ningpo.

[Received March 1, 1873.]

Two brown Scaup Ducks were brought to me alive the other day (21st October 1872) by a fisherman, who said he had taken them, along with several others of the same kind, in his fishing-nets, out of very large flocks, off the mouth of our river. From the mottling of their backs it was easy to see that they belonged to the Scaup group; but they were too small for the true *Fulix marila*, which I had before procured at Anoy.

I looked at Yarrell's 'British Birds,' and Baird's 'Report of Explorations and Survey' &c., part 2. Birds, and made them out to be the *Fulix affinis* (Eyton), or American Scaup. I got the fisherman to bring me the remaining birds, and picked out five more from this dead lot, which gave me three adult males and one adult female.

They all agreed in smallness of size and main characters, which showed them to be of the same species. One peculiarity, however, I noticed in them, which neither Yarrell nor Baird mentions; and that is "*the white on the primaries of the wings.*" As *Fulix marila* and *F. affinis* are said to have similar wings, I thought the omission of this was accidental; and I was confirmed in this view by turning to M'Gillivray's 'British Birds' (vol. v. p. 118), and reading that *F. marila* has the primaries partly greyish brown, but *from the fourth primary to the tenth secondary is a broad white band*, including the whole length of three quills except the tips; and I concluded therefore that I had got *F. affinis*, and that its occurrence here showed that, as in the case of *Ædemia americana* and *Larus occidentalis*, American sea-birds of the Pacific side often visit Eastern Asia. But a reference to Schlegel ('Muséum des Pays-Bas') upset my speculations. Schlegel points to the less white on the primaries in *F. affinis* as one of the chief distinctions between it and *F. marila*. In his own words (*op. cit. Anseres*, p. 28), "*au blanc des rémiges primaires n'atteignant pas le bord postérieur des secondaires.*" Our bird, then, is not the American *F. affinis*; but it nevertheless must be the bird

* The specimen at Stuttgart measures in a straight line from the end of the skull to the tip of the tail 187 centims.; the skull is 25 centims. long, and 21·5 centims. broad. (See Ann. & Mag. Nat. Hist. 1873, xii. p. 77.)

M. Gervais has published a paper on the skeleton of a young animal of this genus in the Nouv. Arch. du Muséum, and has described a fossil species, *Sphargis pseudostracion*. (See Ann. & Mag. Nat. Hist. 1873, xi. p. 471.)

that Mr. Yarrell mentions under the head "American Scaup," which was brought home by Capt. Beechey from Behring's Straits, and was apparently identified with that species. Sir John Richardson suggests for this Pacific species the name *mariloides*, which is usually regarded as a synonym of *affinis*. But I think it can now be shown that *F. mariloides* is a species of itself, and a visitant to the Chinese coast. *Fuligula marila* also occurs here in abundance; and I have a fine male specimen from Amoy. A female that I procured in Amoy, however, was so small that I referred it to *F. cristata*, when Mr. Tristram pointed out its entire want of crest and the speckling on its back, and said it must be *Fulix marila*. It must, I think, have been *F. mariloides*. I suppose that H.M.S. 'Blossom's' collections are preserved somewhere in England. It would be interesting for any lover of Ducks to examine the Scaups brought home from Behring's Straits.

I have now got some of our birds alive, and will do my best to send them to the Society's Gardens, that there their habits may be compared with those of the true *Fulix marila**.

I will now give a description of an adult male and female of the Duck, which I have carefully examined.

Male. Length 17·25 inches; wing $8\frac{1}{2}$ inches; tail $2\frac{1}{2}$ inches, of 14 pointed tail-feathers, centrals longest, giving a roundish wedge-shape to the whole. Bill greyish blue, dertrum and outer edge of tip black. Feet and legs yellowish plumbeous, dark grey in joints, and blackish on webs; tarsi 1·5 inch; middle toe and claw $2\frac{3}{4}$ inches. Head black, with faint dull purplish reflections, and a few green-reflecting feathers on ear-coverts and sides of neck; middle of neck brownish; the black of the lower hind neck freckled with yellowish brown. Back and scapulars with less white and more black wavings; wing-coverts only slightly vermiculated with whitish. Wings, rump, and tail much as in *Fulix marila*. Flanks waved with black, and large abdominal flank-feathers washed with liver-brown, and finely waved with black.

Female. Adult much like the male, but browner about the head and neck, with a roundish patch of white on each lore, which is apparently diminishing and being filled in with the blackish brown of the cheeks. Back with less white; flanks browner, with less vermiculations; under wing less white. Length 16 inches; wing $8\frac{1}{4}$ inches; tail 2·3 inches, of 14 feathers. Bill darker than in the male.

A younger female is a lighter, more uniform, plain brown, the white round the bill being confined to the two lores and chin-angle. Back speckled with white.

Young male. Brown, like the young female, but with rich yellowish brown on the head and lower neck, more marked with white on the back and scapulars; is larger, has the flanks more patched with brown, as also the abdomen; is dingier on the belly, and has a broad patch of white all round the bill.

I dissected the adult male and female. The stomachs were large

* Three of these birds arrived alive, but died shortly afterwards. See *antea*, p. 312.—P. L. S.





J. Wolf. del. J. Smit. del.

PTEROMYS TEPHROMELAS

M & N Hanhart. imp



Wolk del. J. Smit lith

M & N Henshart imp

SCIUROPTERUS PULVERULENTUS.

and kidney-shaped and very muscular; both were empty, that of the male containing only a rough calcareous pebble about half an inch wide. The male's windpipe is shaped like that of *F. marila*, figured in Yarrell, but is shorter, broader, and more roundish in its outline.

I have preserved the specimen for future comparison.

The trachea of the female is much narrower than that of the male, and has narrower rings; the bronchi at the crutch separate, and meet again to leave a hole between.

4. Descriptions of three new Species of Flying Squirrels in the Collection of the British Museum. By Dr. A. GÜNTHER, F.R.S., F.Z.S.

[Received February 26, 1873.]

(Plates XXXVII., XXXVIII.)

PTEROMYS TEPHROMELAS. (Plate XXXVII.)

All the upper parts and the tail black; *under-fur ash-coloured*; on parts where the long black hairs have been rubbed off, as between the shoulders, behind the ears, on the forehead, and sometimes on the tail, the grey of the under-fur is more conspicuous. Lower parts of the body and parachute very sparsely covered with greyish-brown hair, except along the median line of the chest and abdomen.

Cheeks without bristles; ears of moderate size; incisors of an adult female white. Length of the body from the nose to the vent 10 inches; of the tail 11 inches; of the carpal spur 2 inches.

An adult female, from Pinang, has been presented by his Grace the Duke of Argyll to the British Museum. A second younger female has been obtained in a collection from Malacca together with the species of *Sciuropterus* described hereafter.

PTEROMYS PHÆOMELAS.

All the upper parts and the tail brownish black, on the neck and middle of the back deep black; *under-fur dark chestnut-brown*. The longer hairs on the hinder half of the back and on the sides with greyish-white tips. Lower parts of the body and parachute sparsely covered with woolly chestnut-brown hair, more densely along the middle of the chest and abdomen and on the outer half of the parachute.

Cheeks without bristles; ears of moderate size; incisors of an adult female yellow. Length of the body from the nose to the vent 13 inches; of the tail $11\frac{1}{2}$ inches; of the carpal spur $3\frac{3}{4}$ inches.

There is only one specimen, an adult female, from Borneo in the British Museum. It is allied to the preceding species, but conspicuously larger, and distinguished by its brown under-fur.

SCIUROPTERUS PULVERULENTUS. (Plate XXXVIII.)

Upper parts of the body and parachute brownish black, powdered

with white, the hairs of the body being greyish for two thirds of their length, the terminal third being brownish black with a white tip. Fur much less thick than in *Sc. alboniger*. Margins of the parachute with a very narrow and inconspicuous yellowish-white edge. Paws and spur light brownish, with many yellowish hairs. Lower parts rather densely covered with hair (especially the body and limbs), yellowish white; scrotum and præanal region orange-coloured. Lower side of the parachute light greyish brown. Tail bushy, constricted near the base, brownish grey, darker along the upper and lower median lines, many of the hairs being black near the tip.

Cheeks without bristles; ears short; incisors of adult males pale yellow. Length of the body from the nose to the vent 10 inches; of the tail 9 inches; of the carpal spur 2 inches 1 line.

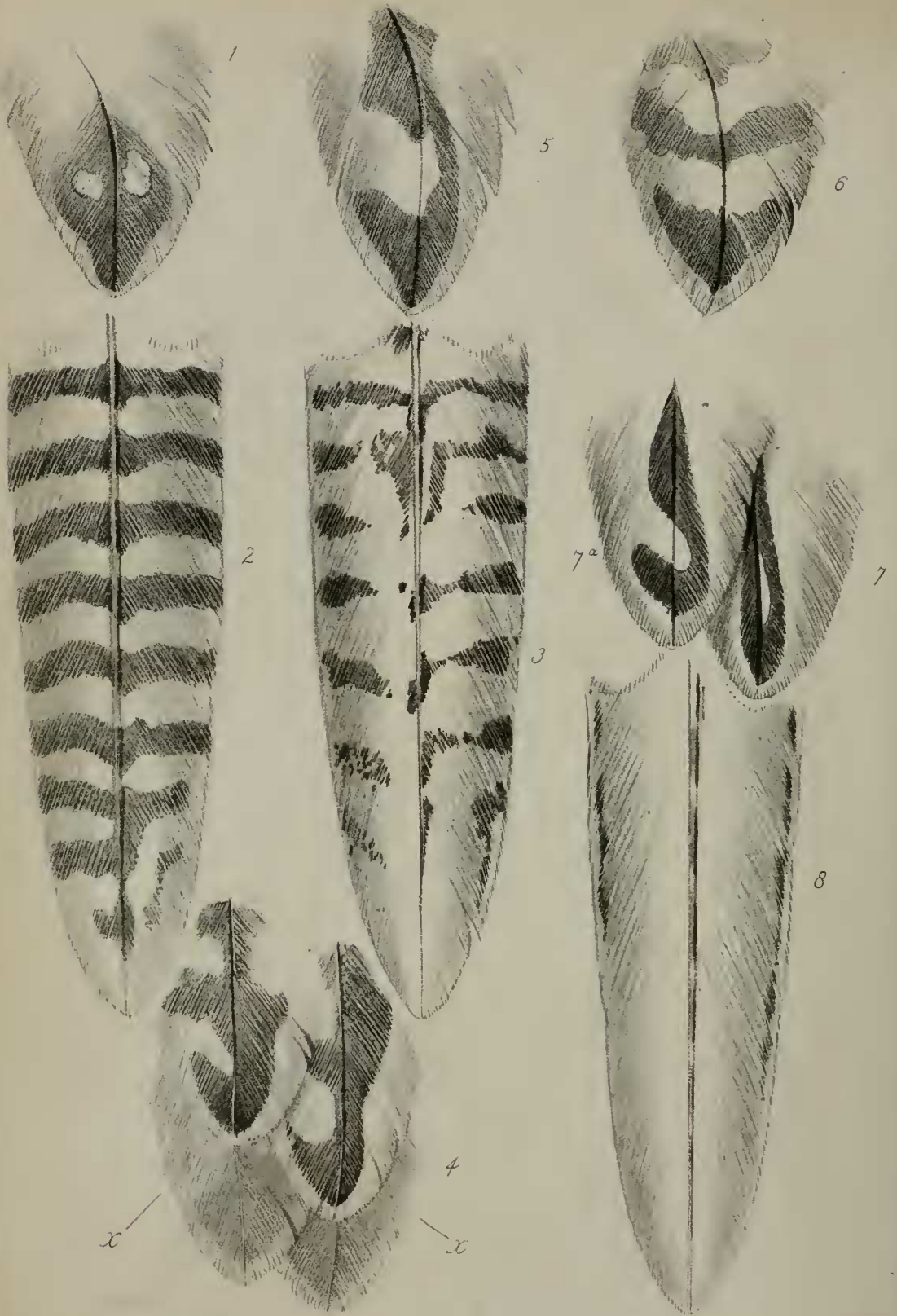
I have seen two examples of this species, both adult males, the tail of one being a little more bushy and darker than that of the other. One is from Pinang, and has been presented by his Grace the Duke of Argyll; the other, from Malacca, has been purchased.

5. On the *Falco arcticus* of Holböll, with Remarks on the changes of Plumage in some other Accipitrine Birds.
By R. BOWDLER SHARPE, F.L.S., F.Z.S., &c., Senior Assistant, Zoological Department, British Museum.

[Received March 4, 1873.]

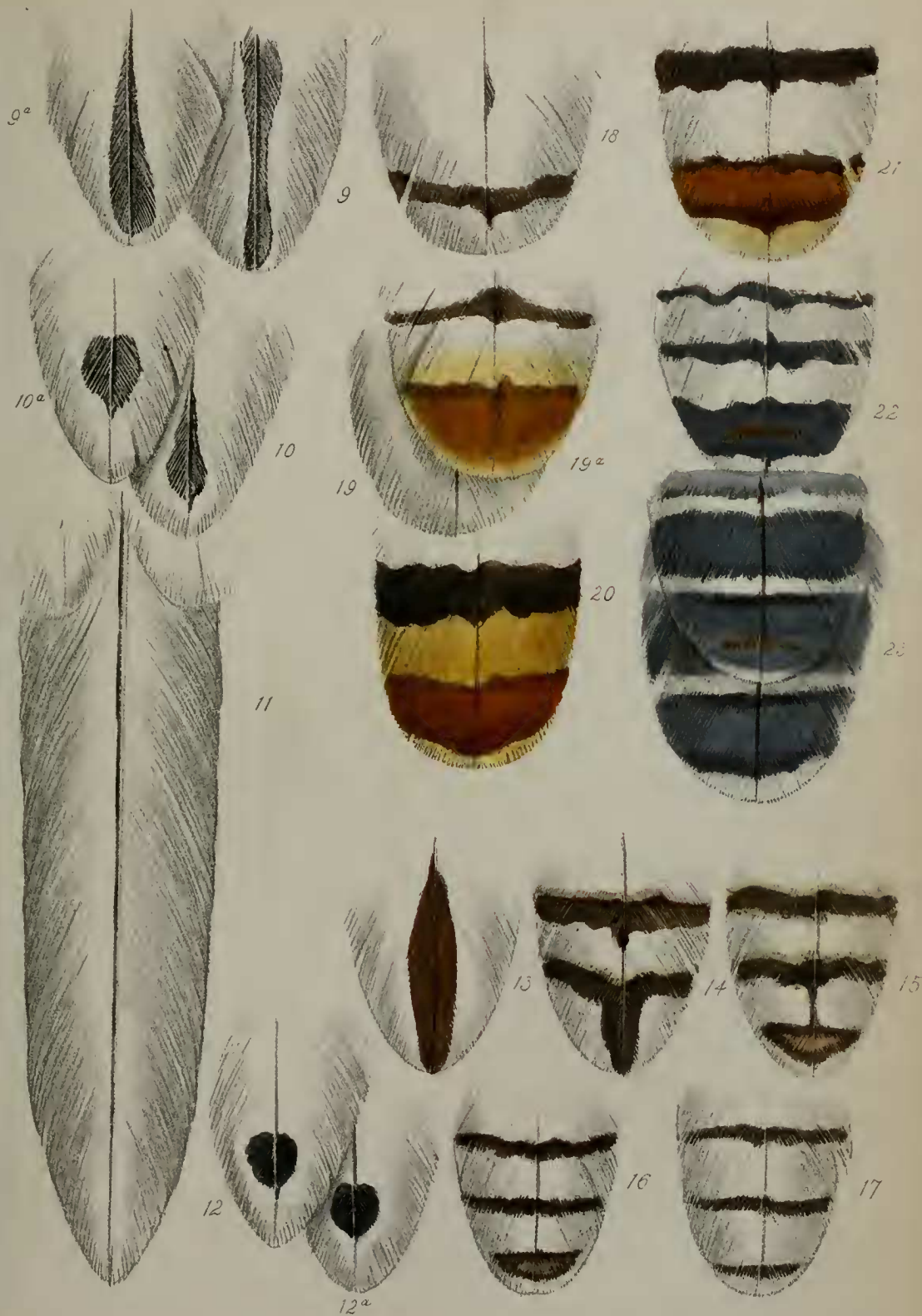
(Plate XXXIX.)

The late Governor Holböll, when in Greenland, paid evident attention to the two Jer Falcons found in that country, and recognized two distinct species, though he failed to assign to them thoroughly trenchant characters; hence the difficulty in the recognition of his *Falco arcticus*. In a paper published on the subject in the 'Zeitschrift für die gesammten Naturwissenschaften' (vol. iii. 1854, p. 425), he calls these two birds *Falco islandicus candicans*, Schlegel, and *F. arcticus*, Holböll. He draws up the characters of these two birds not on the differences of colour, but upon certain variations in the proportions of the tarsus and middle toe, &c., and in the shape of the tail. These characters, if substantiated, would have relegated the two Greenland Jer Falcons to different genera, a consummation which would have much simplified the matter; but unfortunately no one was ever able to ratify them, and the confusion became worse confounded. We possess in the Museum several birds collected in Greenland by Holböll, and among them a noble series of the true Greenland Jer Falcon (*Falco candicans*). On the stands of some of these the late Mr. Gray has recorded (doubtless from Holböll's own tickets) that they are the *F. arcticus* of Holböll, from which it would appear that his species consisted partly of the fresh-moulted examples of *F. candicans* (the so-called "dark race"), and partly of the "light variety" of the Iceland Falcon found in Greenland. No one, there-



J.G.Keulemans. lith

CHANGES OF PLUMAGE IN FA



M & N Hanhart. imp.

fore, can hope to say positively what Holböll's *Falco arcticus* really was; but there is little doubt that the occurrence of a form of Iceland Falcon in Greenland led him to see two species, though it bears some resemblance to the true *F. candicans* when it is very old. Should ornithologists agree with me, that the bird hitherto known as *Falco islandus*, from Greenland, is really the origin of Holböll's *F. arcticus*, I propose to call it after that unfortunate gentleman, as his title has already been preoccupied by Gmelin, who conferred it on the *Falcon d'Islande* of Brisson (Orn. i. p. 336). This bird, said to be from Iceland, has never been satisfactorily identified, but is described as being like the Peregrine, with a yellow eye.

I am by no means the first to recognize the distinctness of this fourth Jer Falcon; for Messrs. Salvin and Brodrick have already drawn attention to it, calling it the "light variety" of the Iceland Falcon; while Professor Schlegel has, most justly in my opinion, considered it as distinct from the true Iceland Jer Falcon as is the Jer Falcon of Norway (*Falco gyrfalco*). The following will, I believe, be found to be the correct synonymy of the species:—

FALCO HOLBÆLLI, sp. n.

Falco arcticus (nec Gm.), Holböll, Zeitschr. f. d. ges. Naturw. iii. p. 426 (1854); Blasius, Naumannia (1857), p. 238; *id.* Naetr. Naum. Vög. Deutschl. p. 19 (1860, nec Taf. 390. fig. 2)*.

Iceland Falcon (light variety), Salvin & Brodr. Falconry, p. 87, pl. x. (1855).

Falco gyrfalco grænländicus, Schl. Mus. P.-B. *Falc.* p. 13 (1862).

Adult male. Head white, with blackish shaft-stripes, a little broader on the nape; rest of the upper surface greyish brown, with more or less of a bluish shade according to the light, transversely banded and tipped with white; quills brown, edged and tipped with white, and freckled on the outer webs; on the smaller secondaries are indistinct bands of brown, alternating with bars of greyish white, the latter plentifully freckled with brown; tail ashy grey, tipped with white, freckled plentifully with brown, and showing cross bars on the outer feathers; under surface white, the throat and chest entirely unspotted, the rest of the body sparingly spotted with blackish, taking the form of bars on the flanks, thighs, and under tail-coverts; under wing-coverts white, spotted with black; inner face of wing whitish, barred with blackish; cere, orbits, and feet yellow; bill bluish, yellow at base of lower mandible; iris dark. Total length 19 inches, culmen 1·3, wing 14, tail 7·5, tarsus 2·1.

Adult female. Similar to the male, but larger. Total length 20 inches, culmen 1·4, wing 15·2, tail 5·5, tarsus 2·2.

Hab. Greenland.

Falco holbælli is distinguished from *F. islandus* by its smaller size, by the larger white spots and bars on the upper surface, which

* As Professor Blasius, in quoting Holböll as the describer of this species designates the bird he wishes to be recognized as *F. arcticus*, I have referred his notices to this Falcon; but he evidently mixes up *F. candicans*, *F. islandus*, and *F. holbælli* together: witness his references to the plates in 'Naumannia.'

give it a much lighter and more mealy aspect, but, above all, by its pure white chest, which is devoid of all streaks or tear-shaped drops as in the true Iceland Jer Falcon. It is altogether a much lighter bird than its congener, especially on the head, which is white, with a few blackish lines. The male bird in the national collection is beginning to lose the bars on the two centre tail-feathers, where they are breaking up into minute frecklings, which I never found to be the case in the Iceland Jer Falcons I have examined. This dissolution of bars on the tail has been noticed in *F. candicans*, to which *F. holbælli* in its mature state bears some resemblance (as noticed by Holböll); but that species loses its mottled or irregularly barred tail before it becomes very old—long before it attains the age of the specimens which I have made the types of my *Falco holbælli*.

Professor Schlegel has truly remarked that the difficulties of studying Birds of Prey are enormous; and this opinion I can indorse from my own experience. But the adult birds at least of all the northern Falcons, ought to be easily recognizable to any one who will take pains; and in studying *Accipitres* nothing but the greatest amount of patience will produce a satisfactory result. A Greenland Jer Falcon can be told at any age by its white flanks and thighs, which have never more than a small longitudinal streak of brown along the shaft, whereas in the other three species these parts have large dart-shaped marks almost worthy to be called cross bars. The Norway Jer Falcon has a uniform dark head, whereas *F. islandus* and *F. holbælli* have both white heads narrowly streaked with black. Of the differences between these two birds I have spoken above; and I believe that by following these points any careful student will make out the species. I must add that, after much laborious study, I have failed to find a character by which the young of the three last-named species may be distinguished one from another.

It will be noticed above that I have alluded to the “so-called” *dark race* of the Greenland Jer Falcon; and I may at once state that I believe this race has no existence at all in nature. I have endeavoured to trace the sequence of Hawks during their progress towards maturity; and by the help of a good series of birds I am able to offer to the Society to-night some interesting facts bearing on the changes of plumage, on which subject I have already made a few remarks*.

The accompanying Plate (fig. 1) represents a feather taken from the back of a very young *Falco candicans*; and in a study of this species the middle tail-feathers must always be taken as indicative of the age of the specimen: in the old bird the tail is always pure white, and in the young one is irregularly but completely barred. In considering the progress of Accipitrine birds towards maturity, it is necessary to bear in mind two rules, viz. :—

Rule 1. That no two birds of the same species absolutely follow the exact sequence of change in their assumption of the adult plumage.

Rule 2. That not every species of the same genus gains the adult

* Cf. my notes on *Petrocosyphus*, in P. Z. S. 1872, p. 496, and in Sharpe and Dresser's ‘Birds of Europe.’

plumage by the exact sequence of change followed by another allied species.

There can be no doubt that when we thoroughly understand the changes of plumage undergone by species of birds, a new light will be thrown upon ornithology as regards the relation of geographical races and subspecies.

In treating of the Greenland Falcon, one difficulty always presents itself; and that is, the almost impossible chance of getting specimens correctly sexed and dated; and in a study of this kind this is half the battle. To capture a specimen, and watch the gradual changes in confinement, would doubtless afford some clue; but the species under consideration would be an unsuitable one for experiment, as there can be little doubt that confinement in England would produce more or less the consequences of arrested development in the plumage, by destroying the need of assimilative colouring which induces the species to become white in the regions it inhabits.

Fig. 2 represents the centre tail-feather of the bird from whose back I took the first feather (fig. 1); and it will be noticed that the lower bars give traces of approaching dissolution. The way in which this takes place is well illustrated in fig. 3, which is the tail-feather of a slightly older bird. Fig. 4 represents the back of a young bird changing from its first into its second plumage: *x* is the old feather, very similar to fig. 1; and the darker feathers are the new ones being donned. Fig. 3 is the middle tail-feather of this identical specimen; and thus it appears that the commencement of the great change of tail takes place about the time of the first moult. Fig. 5 is a feather taken from a bird not yet fully adult, but in full clean-moulted plumage; it has a tail in the same stage as fig. 3, and is doubtless very little older than the specimen whose tail is thus represented in the Plate: in fact it is in the full plumage indicated by the new feathers (fig. 4), and shows its slightly advanced age by the greater extent of the white indent. The step from this stage of the dorsal feathers to the next (fig. 6) is tolerably evident; for here the bars, indicated in the previous stages, are quite complete. A bird thus marked is the adult of the "dark race" of Mr. Gould, which we have thus followed from its young to its perfect plumage.

It will perhaps render my argument more intelligible if, for the present, we leave aside the feathers represented in figs. 7, 7 *a*, and 8, and proceed at once to the consideration of the so-called "light race" of *F. candicans*. It is a remarkable fact that, although there exists great difference in the tail-feathers in the dark race, the light form should have the tail nearly uniform white in both young and old. Thus figs. 9, 9 *a* are taken from the back of a bird in the "tear-dropped" plumage, which is supposed to be the young, and figs. 10, 10 *a*, 12, 12 *a*, are all from the backs of very old birds. With this last fact I perfectly agree; but so far from considering the feathers figured as 9, 9 *a* to be those of a *young* bird, I consider that they are the sign of a *very old* specimen, only one whit less old than the one from whose back the feathers figs. 10 and 10 *a* have been drawn. The

irregular shape of fig. 9 indicates that it is not perfect, and that it will undergo a further change; and although the marking is not of the same form as the feather placed in juxtaposition, they both have the same object in view, and are neither of them so very unlike fig. 10. The heart-shaped spot is, as far as we at present know, the limit beyond which adult Greenland Falcons "can no further go."

To return to the question of the light and dark races, I would ask the advocates of that view of the question to which they would refer a specimen with the dorsal feathers as illustrated in figs. 7 and 7 *a*. The right-hand figure belongs to the young of the "light" race, but the left-hand one should be referred to the "dark" race. It is to me self-evident that fig. 7 is the previous stage of such a feather as fig. 9 *a*; and it is equally clear that fig. 7 *a* is the antecedent stage of fig. 7. The tail (fig. 8) is also closely allied to fig. 11, but still shows traces of the markings visible on all birds of the "dark race," which have here not entirely dissolved; thus the tail, as well as the dorsal featherings, is intermediate between the two races, and to my mind illustrates their connexion. The sequence from the triply barred stage (fig. 6) to the longitudinal drop is not so clear, unless these changes are more rapid than we have at present supposed, or that the feather regains its longitudinal form by the gradual closing up and re-joining of the bars, which, from the irregular outline on the middle bar of fig. 6, seems not absolutely impossible. It appears likely, however, that a partial moult may intervene between the stages indicated in fig. 6 and figs. 7 and 7 *a*; for I have noticed in some Accipitrine birds changes which induce me to believe in a rule which may be enunciated thus:—

Rule 3. That in the progress to maturity, when the changes of plumage are very different from one another, the new dress still retains an indication of what the former one was like before the moult.

Thus, if fig. 7 *a* is the result of a moult, it still shows evidences of the previous barred plumage, though they quickly disappear (fig. 7) and pass through the stages (figs. 9, 9 *a*, 10) to the final spots (figs. 10 *a*, 12, 12 *a*), which, from their irregular outline, might seem intent upon getting even smaller still.

Let any one who doubts the possibility of markings such as those on the Greenland Falcon becoming gradually changed without an intermediate moult, study the changes exhibited by the common Sparrow-Hawk in its progress towards maturity. The general characteristic of the species of *Accipiter* is to have a striped plumage when young and a barred dress when old. But it is not generally known that this is effected by a gradual change in the markings of the feather, and not by an actual moult. Just as in the Greenland Jer Falcon we could tell the age of a bird by the state of the bars on the tail, so we can tell that of a young Sparrow-Hawk by the extent of the rufous edging to the feathers of the upper surface: if these are very broad and distinct, the bird is quite young; for they gradually wear off as it progresses in age. On the first appearance of the feathers from the downy covering of the nestling,

the markings on the chest are longitudinal drops (fig. 13) of a pale rufous-brown colour. The gradual dissolution and breaking up into three bars is shown in fig. 14. Hence, when the bars are perfectly developed, a shade of darker brown overspreads the upper margin, gradually eclipsing the rufous-brown shade, which remains the evidence of the previous plumage (fig. 15). Thence are shown two successive stages of the development of the dark brown shade which at last removes all traces of the reddish tint (figs. 16, 17).

The last illustration which I shall have the pleasure of bringing before the notice of the Society is one of a species of American Kite, *Cymindis uncinata*, which undergoes excessive variation during the progress from youth to maturity. The young bird is white underneath, with a few irregular dusky cross bars (fig. 18). From this dress the next stage (fig. 20), which consists of bright rufous and buff bars, is gained by a moult (fig. 19), as will be seen by the feather just beginning to appear. The fading of the buff in the next stage leaves the under surface barred with white and rufous in very distinct contrast (fig. 20). Hence the rufous bars gradually change into blue (fig. 22); and that this is gradually effected will be seen by the feather figured, which still retains traces of its former rufous colour (fig. 21) now dying away. The last plumage of the bird is apparently entirely blue underneath, as the gradual extension of the blue cross bars, which merge together by degrees, would entirely cover the entire under surface (fig. 23).

I have never seen any intermediate feather between fig. 21, which has only two cross bars, and fig. 22, which has three; so that it is possible that a moult intervenes; in which case the change comes under rule 3.

EXPLANATION OF PLATE XXXIX.

- Fig. 1. Dorsal feather of *Falco candicans*, very young.
2. Central tail-feather from same specimen.
3. Ditto, of slightly older bird.
4. Two fresh-moulted dorsal feathers of a young *Falco candicans*, supposed to be in its first moult. *a*, the old feathers of previous plumage.
5. Dorsal feather of immature *Falco candicans* in full clean-moulted plumage, showing further advance towards cross bars.
6. Dorsal feather of immature bird, the supposed *adult* of "dark race."
- 7, 7 *a*. Two dorsal feathers from mature bird, showing approach to longitudinal drop.
8. Tail-feather of same specimen.
- 9, 9 *a*. Two dorsal feathers of bird in "tear-dropped" plumage; the supposed *young* of "light race."
- 10, 10 *a*, 12, 12 *a*. Dorsal feathers from very old birds.
11. Tail of very old bird.
- 13-17. Breast-feathers of young *Accipiter nisus*, showing gradual change from drop to bars.
18. Breast-feather of very young *Cymindis uncinata*.
19. The same, showing fresh-moulted feather (19 *a*).
- 20, 21. Full plumage of *C. uncinata*.
- 22, 23. Breast-feathers of very old birds, showing gradual change from the rufous to blue plumage.

6. A List of the Spiders of the Genus *Acrosoma*, with Descriptions of new Species. By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

[Received March 6, 1873.]

In the present paper I have made a complete list of the species hitherto described of this truly remarkable genus: five new species are added, one or two of them being most extraordinary forms.

The spines on the members of this group are doubtless protective, either, as (probably) in the case of the *Gasteracanthæ*, to render them like the thorny leaves, knots of shrubs, acacias, &c., or, as (probably) in the present genus, to render them unpalatable morsels for insectivorous birds and reptiles. It is a fact, Mr. Bates says, that the *Acrosomata* spin their webs in the most exposed situations, where they are sure to be seen by any passing enemy.

Genus ACROSOMA, Perty.

1. ACROSOMA CYANOSPINUM.

Epeira cyanospina, Lucas, Dict. Pitt. d'Hist. Nat. iii. p. 70, pl. 140. f. 3 (1835).

Plectana cyanospina, Walckenaer, Apt. ii. p. 178. n. 42 (1837).

British Guiana (*Schomburgh*); Rio Negro (*Wallace*); Pará (*Bates*). B.M.

We have a variety from Pará in which the four anterior spines are red.

2. ACROSOMA FURCATUM.

Aranea armata, Olivier, Enc. Méth. iv. p. 205. n. 24.

Aranea taurus, Fabricius, Ent. Syst. ii. p. 424. n. 64.

Plectana furcata, Walckenaer, Apt. ii. p. 176. n. 40 (1837).

Haiti.

Seems allied to *P. cyanospina*.

3. ACROSOMA MACRACANTHUM.

Plectana macracantha, Walckenaer, Apt. ii. p. 183. n. 52 (1837-39).

Acrosoma spinosum, Koch (nec Linn.), Arachn. iii. p. 56, pl. 92. f. 210 (1836).

Pará (*Bates*); Brazil (*Doubleday*).

B.M.

4. ACROSOMA DEFENSUM, n. sp.

Cephalothorax elongate, broadly expanded in the centre, with median transverse depression as in *A. macracantha*: abdomen longitudinally subovate, deeply excavated in front and truncated behind, with ten acute spines:—two vertical, rather short at base, springing from either side of the sinus; two on a prominent transverse ridge, at about one third the length of the abdomen from the base, longer,

but also vertical; the other six at end of abdomen—the first two longest, bent almost horizontally downwards over the abdomen and widely divergent, the second pair springing laterally from the posterior angles of the abdomen, the third pair immediately below the origin of the second, springing from the ventral surface backwards, and slightly divergent: ventral surface with three or four longitudinal and transverse submarginal sulci.

Colours. Cephalothorax black, with testaceous margin; falces and maxillæ black above, becoming pitchy towards their extremities; labium ochraceous, clouded with brown; sternum and legs black; abdomen dark red above, coarsely punctured in the centre; spines pitchy; ventral surface brownish red, with regions of spinnerets and epigyne blackish.

Pará (*Wallace*). One specimen.

B.M.

A remarkable species, allied to *A. macracanthum* of Walckenaer. It differs entirely in the relative length of the spines—first pair 1 line, second $1\frac{1}{3}$ line, third 3 lines, fourth 2 lines, fifth $1\frac{1}{4}$ line.

5. ACROSOMA SPINOSUM.

Aranea triangulari-spinosa, De Geer, Insectes, vii. p. 321, pl. 39. f. 9, 10.

Aranea spinosa, Linnæus, Syst. Nat. p. 1037. n. 47 (1766).

Plectana spinosa, Walckenaer, Apt. ii. p. 172. n. 33 (1837).

Sp. ead.? Pará (*Grahame*).

B.M.

6. ACROSOMA VIGORSII.

Acrosoma vigorsii, Perty, Delect. Anim. p. 194, pl. 38. f. 8 (1830); Koch, Arachn. vi. p. 123, pl. 209. f. 520 (1839).

Pará (*Bates*).

B.M.

7. ACROSOMA ARMATUM.

Plectana armata, Walckenaer, Apt. ii. p. 179. n. 43 (1837).

Acrosoma armatum, Koch, Arachn. xi. p. 65, pl. 376. f. 885 (1845).

Haiti (*Tweedie*).

B.M.

8. ACROSOMA FORCIPATUM.

Acrosoma forcipatum, Thorell, Öfvers. Vetensk. Akad. Förhandl. xvi. p. 300. n. 1 (1859, edit. 1860); Eug. Resa, Zool. Arachn. i. p. 25 (1868).

“Cuba” (*Thorell*).

Seems allied to *A. armatum*, Koch.

9. ACROSOMA ACULEATUM.

Aranea aculeata, Fabricius, Ent. Syst. ii. p. 417. n. 37.

Aranea elongato-spinosa, De Geer, Ins. vii. p. 323, pl. 39. f. 11, 12.

Plectana aculeata, Walckenaer, Apt. ii. p. 180. n. 44 (1837).

Surinam. —?

B.M.

The type of this species is in the Banksian Collection.

10. ACROSOMA VESPOIDES.

Plectana vespoides, Walckenaer, Apt. ii. p. 196. n. 72 (1837-39).

"Cayenne" (*Walckenaer*).

Seems allied to *A. aculeatum*.

11. ACROSOMA SEXSPINOSUM.

Epeira sexspinosa, Hahn, Monogr. der Spinn. iii. pl. 4. f. A.

Acrosoma sexspinosa et furcata, Hahn, Arachn. ii. p. 18, pl. 43. f. 107 (1834).

Plectana squamosa, Walckenaer, Apt. ii. p. 185. n. 54 (1837-39).

Acrosoma militare, Koch (nec Fabr.), Arachn. iv. p. 12, pl. 112. f. 258 (1837).

Guiana, Surinam, Cayenne (*Walckenaer*); Colombia (*Goudot*).

B.M.

12. ACROSOMA KIRBYI.

Acrosoma kirbyi, Perty, Delect. Anim. p. 194, pl. 38 (1830).

Pará (*Bates*).

B.M.

13. ACROSOMA FLAVOMACULATUM.

Acrosoma flavomaculatum, Keyserling, Sitzungsber. der Isis zu Dresden, p. 77, pl. 2. f. 10 (1863, edit. 1864).

Haiti (*Tweedie*).

B.M.

14. ACROSOMA BOVINUM.

Acrosoma bovinum, Thorell, Öfvers. Vetensk. Akad. Förhandl. xvi. p. 301. n. 2 (1859, edit. 1860); Eug. Resa, Zool. Arachn. i. p. 26 (1868).

"Alabama" (*Thorell*); Philadelphia (*E. Doubleday*); New York.

B.M.

15. ACROSOMA OBTUSO-SPINUM.

Acrosoma obtuso-spinum, Keyserling, Sitzungsber. der Isis zu Dresden, p. 76, pl. 2. f. 9 (1863, edit. 1864).

"St. Andres, Mexico" (*Keyserling*).

Belongs to the *A. bovinum* group.

16. ACROSOMA ACUTUM.

Plectana acuta, Walckenaer, Apt. ii. p. 172. n. 34 (1837); Keyserling, Sitzungsber. der Isis zu Dresden, pl. 2. f. 4 (1863).

"Cayenne" (*Walckenaer*). — ?

B.M.

17. ACROSOMA FLAVEOLUM.

Acrosoma flaveolum, Koch, Arachn. vi. p. 126, pl. 210. f. 522 (1839).

"Brazils" (*Koch*); Mexico (*Cuming & F. Smith*).

B.M.

18. ACROSOMA ARMIGERUM.

Acrosoma armigerum, Koch, Arachn. iv. p. 11, pl. 92. f. 257 (1837).

"Brazils" (*Koch*); sp. ead.? St. Paulo (*Bates*).

B.M.

19. ACROSOMA RUBICUNDULUM.

Acrosoma rubicundulum, Keyserling, Sitzungsber. der Isis zu Dresden, p. 74, pl. 2. f. 7 (1863, edit. 1864).

"Bogota" (*Keyserling*).

Belongs to the *A. armigerum* group.

20. ACROSOMA PUNGENS.

Plectana pungens, Walckenaer, Apt. ii. p. 173. n. 35 (1837); Keyserling, Sitzungsber. der Isis zu Dresden, pl. 2. f. 5 (1863).

"Cayenne" (*Walckenaer*).

A broad species, somewhat like *A. flaveolum* in form, but spined more like *A. armigerum*.

21. ACROSOMA BICOLOR.

Acrosoma bicolor, Keyserling, Sitzungsber. der Isis zu Dresden, p. 73, pl. 2. f. 6 (1863, edit. 1864).

"Bogota" (*Keyserling*); sp. ead.? Venezuela (*Dyson*). B.M.

22. ACROSOMA MILITARE.

Aranea militaris, Fabricius, Ent. Syst. ii. p. 416.

Plectana militaris, Walckenaer, Apt. ii. p. 174. n. 37 (1837).

South America.

According to Walckenaer, this species resembles *A. spinosum*, but has only four spines.

23. ACROSOMA RUBROCINCTUM, n. sp.

Cephalothorax truncate in front and prominent, depressed and expanded behind, with central transverse quasi-suture; abdomen trapezoidal, sinuated in front, and bearing two short obtuse spines, one on each anterior angle, projecting slightly on either side of the cephalothorax; two strong subconical widely divergent acuminate spines directed obliquely from each posterior angle; ventral surface longitudinally wrinkled. Length of abdomen 2 lines; width at widest part $1\frac{1}{4}$ line; entire length $2\frac{1}{2}$ lines; anterior spines $\frac{1}{4}$ of a line, posterior $1\frac{1}{4}$ line.

Colours. Cephalothorax, falcēs, maxillæ, and legs reddish castaneous, labium pale castaneous, sternum pitchy; abdomen above brownish olivaceous, encircled by reddish castaneous including spines; below black, with an orange spot on each side of the spinnerets; spines reddish castaneous.

Brazil. One specimen.

B.M.

A small and obscure species of the *P. crassispinum* group.

24. ACROSOMA RUFOPUNCTATUM, n. sp.

Cephalothorax as in preceding species; abdomen trapezoidal, with two short obtuse spines, one on each anterior angle, projecting obliquely outwards on either side of cephalothorax; two strong subconical, widely divergent acuminate spines directed obliquely outwards from each posterior angle, and nearly horizontal; ventral surface concentrically wrinkled. Length of abdomen 2 lines; width

at widest part $2\frac{1}{4}$ lines; entire length $2\frac{2}{3}$ lines; anterior spines $\frac{1}{4}$ of a line; posterior spines $1\frac{1}{4}$ line.

Colours. Cephalothorax, falces, sternum, maxillæ, and legs reddish castaneous; labium shining ochraceous; abdomen above olivaceous, encircled with orange and covered with red impressed punctures, about thirty in number; anterior spines orange, posterior dark castaneous; ventral surface olivaceous, with six large orange spots arranged in a nearly equilateral triangle on either side; spines as above.

Jamaica.

B.M.

Allied to the preceding species, and to *A. guerinii* of Keyserling.

25. ACROSOMA GUERINII.

Acrosoma guerinii, Keyserling, Sitzungsber. der Isis zu Dresden, p. 79, pl. 2. f. 12 (1863, edit. 1864).

"Bogota" (*Keyserling*).

26. ACROSOMA SAGITTATUM.

Plectana sagittata, Walckenaer, Apt. ii. p. 174. n. 38 (1837); Abbot, Georgian Spiders, f. 50.

Georgia.

B.M.

27. ACROSOMA CRASSISPINUM.

Acrosoma crassispinum, Koch, Arachn. iii. p. 55, pl. 92. f. 209 (1836).

"America" (*Koch*). — ?

B.M.

28. ACROSOMA GLADIOLA.

Plectana gladiola, Walckenaer, Apt. ii. p. 182. n. 51 (1837-39).

Acrosoma aculeatum, Koch (nec Fabr.), Arachn. iii. p. 58, pl. 93. f. 211 (1836).

Venezuela (*Birschell*).

B.M.

29. ACROSOMA PLANUM.

Acrosoma planum, Koch, Arachn. iii. p. 81, pl. 99. f. 228 (1836).

Colombia (*Goudot*).

B.M.

30. ACROSOMA ACUTO-SPINUM.

Acrosoma acuto-spinum, Keyserling, Sitzungsber. der Isis zu Dresden, p. 69, pl. 2. f. 2.

"Bogota" (*Keyserling*).

Probably not distinct from *Acrosoma planum*.

31. ACROSOMA TRIANGULARE.

Acrosoma triangulare, Koch, Arachn. iii. p. 78, pl. 99. f. 226 (1836).

Var.? *Acrosoma excavatum*, Koch, l. c. p. 80, pl. 99. f. 228 (1836).

"Brazils" (*Koch*); sp. ead.? Ecuador (*Buckley*).

B.M.

I doubt whether *A. excavatum* is identical with *A. triangulare*, although Walckenaer has unhesitatingly called it a yellow variety.

32. ACROSOMA DIFISSUM.

Plectana difissa, Walckenaer, Apt. ii. p. 181. n. 47 (1837-39).

Acrosoma bifurcatum, Koch, Arachn. vi. p. 124, pl. 209. f. 521 (1839).

Var. *Acrosoma gilvulum*, Koch, Arachn. xi. p. 67, pl. 376. f. 886 (1845).

"Brazils" (*Koch*); Columbia (*Goudot*).

B.M.

33. ACROSOMA LUCASII.

Acrosoma lucasii, Keyserling, Sitzungsber. der Isis zu Dresden, p. 68, pl. 2. f. 1 (1863, edit. 1864).

"Bogota" (*Keyserling*).

I doubt if this is distinct from *A. difissum*.

34. ACROSOMA FLABELLATUM.

Plectana flabellata, Walckenaer, Apt. ii. p. 192. n. 65 (1837-39).

"South America" (*Walckenaer*).

Seems to come very close to *A. difissum*.

35. ACROSOMA SWAINSONII.

Acrosoma swainsonii, Koch, Arachn. vi. p. 121, pl. 209. f. 519 (1839).

"Brazils" (*Koch*); sp. ead.? Columbia (*Goudot*).

B.M.

36. ACROSOMA GRACILE.

Epeira gracilis, Walckenaer, Tabl. des Aran. p. 65. n. 50; Hist. Nat. des Araign. iii. pl. 5; Apt. ii. p. 193. n. 66 (1837); Abbot's Georgian Spiders, f. 47 & 48.

Georgia.

B.M.

37. ACROSOMA CRASSUM.

Acrosoma crassum, Keyserling, Sitzungsber. der Isis zu Dresden, p. 78, pl. 2. f. 11 (1863, edit. 1864).

Bogota (*Goudot*).

B.M.

38. ACROSOMA PICTUM.

Acrosoma pictum, Koch, Arachn. iii. p. 61, pl. 3. f. 214 (1836).

Columbia (*Goudot*).

B.M.

39. ACROSOMA DE GEERII.

Plectana de geerii, Walckenaer, Apt. ii. p. 174. n. 36 (1837).

Aranea spinosa, var., De Geer, Ins. vii. p. 322.

"Surinam" (*Walckenaer*).

Seems nearly allied to *A. pictum*.

40. ACROSOMA ALATUM.

Plectana alata, Walckenaer, Apt. ii. p. 193. n. 67 (1837-39).

"Province of St. Catharine, Brazil" (*Walckenaer*).

Allied to *A. pictum*.